

# WELL UTILIZATION PROJECT

## Component 2-Draft Component Report



March 2012

**Water Source:** Tracy Sub-Basin of San Joaquin Groundwater Basin

**Project Type:** Water Supply

**Funding Source:** This project is funded by the Proposition 50, Integrated Regional Water Management Grant Program and local matching funds.

**Total Project Cost:** \$3.0 Million (includes design, permitting, CEQA compliance, land rights, construction, and construction management)

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## GRANT SUMMARY

Use the tab and arrow keys to move through the form. If field is not applicable, please put N/A in field.

Completed Grant Summaries are made available to the public on the State Water Resources Control Board's (SWRCB) website at <http://www.waterboards.ca.gov/funding/grantinfo.html>

**Date filled out:** 07/10/2008

<b>Grant Information:</b> Please use complete phrases/sentences. Fields will expand as you type.	
1. <b>Grant Agreement Number:</b> 07-505-550-0	
2. <b>Project Title:</b> DWD Well Utilization Project	
3. <b>Project Purpose – Problem Being Addressed:</b> Provide additional Water Supply and supply reliability	
4. <b>Project Goals</b>	
a. <b>Short-term Goals:</b> Reduce the use of Delta water diversions	
b. <b>Long-term Goals:</b> Provide additional supply during times of drought	
5. <b>Project Location:</b> (lat/longs, watershed, etc.) 37-58-39.53N, 121-40-57.89 W / Tracy Groundwater Sub Basin	
a. <b>Physical Size of Project:</b> (miles, acres, sq. ft., etc.) 2,000 sq. ft. pump station & 2,100 Lf.of 18" pipeline.	
b. <b>Counties Included in the Project:</b> Contra Costa County	
c. <b>Legislative Districts:</b> (Assembly and Senate) 11 <sup>th</sup> & 15 <sup>th</sup> District (Assembly), 7 <sup>th</sup> District (Senate)	
6. <b>Which SWRCB program is funding this grant?</b> Please "X" box that applies.	
<input type="checkbox"/> Prop 13 <input type="checkbox"/> Prop 40 <input checked="" type="checkbox"/> Prop 50 <input type="checkbox"/> EPA 319(h) <input type="checkbox"/> Other	
<b>Grant Contact:</b> Refers to Grant Project Director.	
<b>Name:</b> Mike Yeraka	<b>Job Title:</b> General Manager
<b>Organization:</b> Diablo Water District	<b>Webpage Address:</b> <a href="http://www.diablowater.org">http://www.diablowater.org</a>
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<b>E-mail:</b> <a href="mailto:Mikegm1@aol.com">Mikegm1@aol.com</a>	
<b>Grant Time Frame:</b> Refers to the implementation period of the grant.	
<b>From:</b> 07/1/07	<b>To:</b> 5/01/2012
<b>Project Partner Information:</b> Name all agencies/groups involved with project. N/A	
<b>Nutrient and Sediment Load Reduction Projection:</b> (If applicable) N/A.	

## **I. EXECUTIVE SUMMARY**

This Component is Phase 2 of a three (3) phase project. Phase 1 was completed by DWD with a 2 mgd well being placed into service at Glen Park in August 2006. This Component developed a second 2 mgd groundwater well at the District's Stonecreek Site located approximately one-quarter mile to the north-east of the Glen Park Well. The new groundwater well will reduce the need to purchase more surface water and will operate at higher flow rates in summer months to meet seasonal increases in peak demands. This component included construction of a 16-inch diameter, 300-foot deep well, a 200 hp -2 mgd pump station on 2,000 square feet of land owned by the District and 2,100 lineal feet of 18" pipe connecting to the District's existing Glen Park Well pipeline. The project provides additional water supply for DWD to offset its Delta surface water supply from Contra Costa Water District (CCWD) and provide backup supply in the event of a drought.

## **II. PROBLEM STATEMENT AND RELEVANT ISSUES**

One of the missions of the Diablo Water District is to provide a safe, dependable and adequate supply of high quality water to meet the requirements of the inhabitants and water users within the District at the lowest possible cost. DWD purchases untreated Delta Water through the Contra Costa Water District (CCWD) at a rate of approximately \$585 per acre-foot. One of the goals of the Board of Directors of the Diablo Water District (DWD) is to "Always seek opportunities to augment the District's water supply for improved reliability and reduced costs without sacrificing water quality." DWD has traditionally relied on CCWD for 100% of its water supply and has been subject to rationing due to drought conditions.

DWD strives to make its potable water supply as affordable as possible to its customers. Approximately 40% of the District's operating budget goes towards purchasing Delta water from the Contra Costa Water District. In 2002 the Diablo Water District embarked on a program to make its water supply more affordable and more reliable without sacrificing water quality. DWD has been accomplishing this goal by using a small amount of ground water in place of surface water previously purchased from CCWD. This has helped the District to minimize water rate increases by reducing its operating costs. Implementation of Phase 2 of DWD's Well Utilization Project has further allow the District to reduce its dependence on Delta Water Supplies and help to keep the drinking water supply affordable.

DWD currently has 15 million gallons per day (mgd) of drinking water treatment capacity from the Randall-Bold Water Treatment Plant (RBWTP) in Oakley, which it co-owns with CCWD. With Phase 1 and Phase 2 of DWD's Well Utilization project in operation, DWD has increased its drinking water supply capacity to approximately 18 mgd. Not all of this added capacity will be used on a regular basis, due to water quality reasons outlined below however, it will be available during emergencies and times of drought.

The surface water supply from CCWD has a hardness level that varies anywhere from 45 parts per million (ppm) to 145 ppm. The hardness in DWD's well water supply is approximately 250 ppm. In order to maintain a water quality goal of 140 ppm hardness within the DWD water

distribution system, DWD blends approximately one part well water to four parts of the CCWD surface supply. During the times of the year that the hardness from the CCWD surface supply is high, DWD reduces the amount of well water it uses to such an extent that the well is sometimes off when the CCWD surface supply exceeds 120 ppm of hardness.

Prior to the first phase of the District's well project going on line, DWD has historically relied upon the CCWD surface supply for 100% of its water supply. This has left DWD vulnerable to a loss of its water supply in the event the Randall-Bold Water Treatment Plant, or CCWD's water supply conveyance system were to experience an upset. The District's Well Utilization Project provides a redundancy for the DWD's water supply if such an upset were to take place. The District also has a back up portable generator that can be used to provide power to the Glen Park or Stonecreek well for operations during a power outage.

### **III. PROJECT GOALS AND DESIRED OUTCOMES**

The goals of this project are:

1. Increase drinking water supply capacity.
2. Deliver high quality water to customers
3. Increase water supply reliability
4. Increase surface water supplies for water storage or environmental enhancement
5. Protect Ground Water Supply

#### **1. Increase drinking water supply capacity**

DWD has 15 million gallons per day (mgd) of drinking water treatment capacity from the Randall-Bold Water Treatment Plant (RBWTP) in Oakley, which it Co-Owns with CCWD. With Phase 1 and Phase 2 of DWD's Well Utilization project in operation, DWD has increased its drinking water supply capacity to approximately 18 mgd. Not all of this added capacity will be used on a regular basis, due to water quality reasons outlined below however; it will be available during emergencies and times of drought.

#### **2. Deliver high quality water to customers**

The surface water supply from CCWD has a hardness level that varies anywhere from 45 parts per million (ppm) to 145 ppm (and possibly higher during times of drought). The hardness in DWD's well water supply is approximately 250 ppm. In order to maintain a water quality goal of 140 ppm hardness within the DWD water distribution system, DWD blends approximately one part well water to four parts of the CCWD surface supply. During the times of the year that the hardness from the CCWD surface supply is high, DWD reduces the amount of well water it uses to such an extent that the well is sometimes off when the CCWD surface supply exceeds 120 ppm of hardness.

### **3. Increase water supply reliability**

DWD has historically relied upon the CCWD surface supply for 100% of its water supply. This has left DWD vulnerable to a loss of its water supply in the event the RBWTP, or CCWD's water supply conveyance system were to experience an upset. DWD's Well Utilization Project now provides a redundancy for the DWD's water supply if such an upset were to take place. The District also has a back up portable generator that can be used to provide power to the Glen Park and Stonecreek wells for operations during a power outage.

### **4. Increase surface water supplies for water storage or environmental enhancement**

One of the goals of completing installation of the Stonecreek well is to have a total production of 0.75 mgd of ground water on an annual average basis from both the Glen Park and Stonecreek wells combined with annual increases based on system demands to a target of 2.5mgd on an annual average basis by 2040. By using ground water the District will free up 840 afa to 2,800 afa of Delta surface water supplies for Water Storage or environmental enhancement.

### **5. Protect Ground Water Supply**

Protection of groundwater supply is an important aspect of the project not only for environmental concerns but for the continued viability of the project. DWD currently measures the groundwater level in several production and monitoring wells in the vicinity of the Glen Park and Stonecreek well sites. DWD has also been working with the DWR CASGEM program to become the lead monitoring entity for our area and will be reporting groundwater levels to DWR on an annual basis.

A summary of the project goals, outcomes, and methodology for achieving the outcomes are outlined in Table 1 below.

**Table 1: Project Goals and Outcomes- Well Utilization Project**

<b>Project Goals</b>	<b>Desired Outcomes</b>	<b>Output Indicators</b>	<b>Outcome Indicators</b>	<b>Measurement Tools and Methods</b>	<b>Targets</b>
1. Increase drinking water supply capacity.	1. Produce 0.75 mgd of ground water on an annual average basis with annual increases based on system demands to a target of 2.5 mgd on an annual average basis by 2040.	1. Average use of new Phase 1 and Phase 2 groundwater wells.  2. A lessening of the annual increase in surface water usage with respect to demands as compared to surface water usage without the well.	1. 5 % increase in groundwater production on a year over year basis.  2. 1.5% decrease in surface water use on a year over year basis when compared to what surface water use would be without the well project..	1. Groundwater flow monitoring using well production flow meters.  2. Surface water flow monitoring using distribution system pumping flow meters.	1. Provide an annual average well water supply of 0.75 mgd; growing to an annual average of approximately 2.5 mgd at build out of the population within the District.

Draft Component Report- Proposition 50, Integrated Regional Water Management Grant Program  
Component 2: Well Utilization Project – Diablo Water District (DWD)

2. Deliver high quality water to customers.	1. Blend ground water with the District's surface water supply while delivering water with a hardness of approximately 140 mg/l but not more than 150 mg/l, except during emergency conditions.	1. Measure groundwater and surface water hardness to determine blend ratios.	1. Measure hardness of supplies delivered to the distribution system.	1. Real-Time continuous electronic analytical measurement of Electrical Conductivity converted to Hardness.  2. USEPA and Standard Lab Methods of routine distribution system samples.	1. Delivered water hardness of approximately 140 mg/l but not more than 150 mg/l, except during drought or emergency conditions.
3. Increase water supply reliability.	1. During emergency shortages or drought reductions of surface supply, use ground water supply at its maximum capacity as needed to meet critical demands.	1. Temporarily maximize use of well supply during droughts.  2. Temporarily maximize use of well supply during emergencies.	1. Up to 25% increase in groundwater use to off-set reductions in surface supply.  2. Up to 75% increase in groundwater use in the event of a loss of surface water supply.	1. Groundwater flow monitoring using flow meter.  2. Surface water flow monitoring using distribution system pumping flow meters.	1. Provide maximum well capacity of up to 3 mgd during emergencies or droughts.
4. Increase water available for environmental enhancement.	1. Produce 0.75 mgd of ground water on an annual average basis with annual increases to a target of 2.5mgd by 2040.  2. By using ground water the District will free up 840 afa to 2,800 afa of CVP surface water supplies for Water Storage or environmental enhancement.	1. Reduce surface water use by using groundwater to meet part of demand.	1. Develop sustainable well capacity of 520 gpm with the Phase 1 and Phase 2 wells in service, increasing to an annual average of 1,700 gpm by 2040.	1. Groundwater flow monitoring using flow meters.  2. Surface water production records.	1. 20 % reduction in surface water use with Phase 1 and Phase 2 of the well project in operation.
5. Protect ground-water supply.	1. Manage local ground water resources to prevent over drafting and maintain a sustainable basin.	1. Manage supplies for sustainable groundwater use.	1. Consistency with AB 3030 Ground-water Management Plan.	1. Monitor Ground water Levels within the basin.  2. Monitor Ground water quality within the basin.  3. Monitor land subsidence within the basin	1. Limit groundwater pumping within sustainable yield of the Tracy Subbasin Aquifer as indicated by groundwater level and pumpage data from the monitoring program reported in the annual Ground Water Management Report to DWR.  2. Maintain consistency with AB 3030

					Groundwater Management Plan available at <a href="http://www.diablowater.org">www.diablowater.org</a> under documents.
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#### IV. PROJECT DESCRIPTION

##### **Project Type/Cost/Funding Sources**

This project is categorized as a water supply project. The total cost of the project was \$3 million and includes all design, permitting, land, mitigation, construction, and construction management costs. It was funded by \$2.3 million matching funds from Diablo Water District and a \$700,000 grant from the Integrated Regional Water Management Grant Program, Proposition 50. The project includes construction of a 2 million gallon per day well and pump station, and approximately 2,100 lineal feet of 18-inch pipe connecting to the District's existing 18-inch well pipeline. Of the \$3 million, \$1.53 million went towards construction costs and \$1.47 million went towards, the project EIR, permits, right-of-way acquisition, design engineers, extension of PG&E service, construction management and inspection.

##### **Project Methodology/Construction**

Construction of the Well Utilization Project was divided into three separate contracts based on the type of work and to allow for construction of multiple phases of the project in parallel to reduce construction duration and cost.

The three contracts were as follows:

- **PIPELINE CONTRACT:** The pipeline contract included the construction of 480 lineal feet (lf) of 18-inch C-900 PVC pipe, 1,330 lf of 18-inch ductile iron pipe and 135 lf of 18-inch mortar lined and coated steel pipe. Work included jack and bore 100 lf of 28-inch steel casing under Marsh Creek, and repaving approximately 1,340 lf of a 12-foot wide East Bay Regional Park District trail. The total construction cost for this contract with the Platinum Pipelines was \$570,000.
- **WELL CONSTRUCTION CONTRACT:** The well construction contract included installation of 230 feet of 16-inch steel casing and 75 feet of 16-inch stainless steel well screen and was completed to a depth of 305 feet below grade. A 36-inch diameter conductor casing was completed to a depth of 50 feet below grade and a concrete sanitary seal was installed to 185 feet below grade. The total construction cost for this contract with Maggiora Bros. Drilling was \$157,000.



- **WELL PUMP STATION CONTRACT:** This contract included construction of a 878 sq. ft. block building with removable roof section, 200 hp submersible well pump and motor, local grading and access driveway, above ground and below ground piping ranging from 10-inches to 18-inches in diameter, extension of 21KV PG&E service and installation of a variable frequency drive unit. The total construction cost for this contract with McFadden Construction Company was \$743,000.

Before and after photos are included in Appendix A at the end of this report.

### **Water Quality Data**

Included as Appendix B are the results of the water quality analysis for the Stonecreek well that was conducted in accordance with the California Department of Public Health requirements. Also included in Appendix B is a copy of the water quality from samples taken from the blend of Stonecreek and Glen Park groundwater with the District's surface water supply from the Randall-Bold Water Treatment Plant, before the water enters the District's distribution system.

### **Water Quality Data Evaluation**

The surface water supply from CCWD has a hardness level that varies anywhere from 45 parts per million (ppm) to 145 ppm. The hardness in DWD's well water supply is approximately 280 ppm. In order to maintain a water quality goal of 140 ppm hardness within the DWD water distribution system, DWD blends approximately one part well water to four parts of the CCWD surface supply. During the times of the year that the hardness from the CCWD surface supply is high, DWD reduces the amount of well water it uses to such an extent that the well is sometimes off when the CCWD surface supply exceeds 120 ppm hardness. As can be seen in Appendix B the Blended Hardness is 130 ppm which indicates that the District is meeting its Project Goal of maintaining a hardness level of not more than 140 ppm.

Therefore, the water quality project performance measures are being met.

## **V. PUBLIC OUTREACH**

The District printed and distributed newsletters in the Spring of 2011 before the Stonecreek well went into service advising all of their customers that the well was under construction. The District also printed and distributed newsletters in the Winter of 2011 to all of its customers advising them that the well had been completed and was in operation. Copies of the two newsletters are included in Appendix C. The District also provided extensive public notification when the Draft Environmental Impact Report was available for public review in 2008.

## VI. CONCLUSIONS

### **Project Evaluation and Effectiveness-Results of PAEP**

**Table 2**

<b>Project Goals</b>	<b>Desired Outcomes</b>
Increase drinking water supply capacity.	Produce 0.75 mgd of ground water on an annual average basis with annual increases based on system demands to a target of 2.5mgd on an annual average basis by 2040.
Deliver high quality water to customers	Blend the ground water with the District's surface water supply while delivering water with a hardness of approximately 140 mg/l but not more than 150 mg/l, except during emergency conditions.
Increase water supply reliability	During emergency shortages or drought reductions of surface supply, use ground water supply at its maximum capacity as needed to meet critical demands.
Increase surface water supplies for water storage or environmental enhancement	Produce 0.75 mgd of ground water on an annual average basis with annual increases to a target of 2.5mgd on an annual average basis by 2040. By using ground water the District will free up 840 afa to 2,800 afa of Delta surface water supplies for Water Storage or environmental enhancement.
Protect Ground Water Supply	Manage local ground water resources to prevent over drafting and maintain a sustainable basin.

## Discussion of Targets

### Increase drinking water supply capacity.

Table 3 provides the daily totals of groundwater used for calendar year 2011. As can be seen, on June 18, 2011, groundwater production increased significantly, which represents the added capacity of the Stonecreek well coming on line that day. The desired outcome for this goal was to have an annual daily average of 0.75 mgd. As shown in Table 3, the annual daily average for 2011 was 1.18 mgd, which exceeds the project goal of 0.75 mgd.

**Table 3**

WELL WATER BLENDED INTO DISTRIBUTION SYSTEM MILLION GALLONS(MG)												
	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
1	0.530	0.498	0.636	0.612	1.326	0.887	2.460	2.018	2.056	1.904	1.147	0.971
2	0.527	0.506	0.561	0.592	1.245	0.920	2.124	2.399	2.200	2.132	1.678	0.015
3	0.575	0.638	0.516	0.653	1.375	1.544	2.217	2.133	1.960	1.603	1.332	0.671
4	0.517	0.547	0.524	0.894	1.232	0.536	2.606	2.365	1.520	1.403	1.283	0.671
5	0.543	0.593	0.493	0.771	1.496	0.938	2.161	2.178	1.724	1.325	1.080	0.552
6	0.570	0.680	0.589	0.795	1.144	1.071	2.317	2.255	2.085	1.413	1.052	0.691
7	0.490	0.502	0.578	0.779	1.385	0.999	2.338	2.400	1.973	1.191	0.944	0.485
8	0.573	0.624	0.542	0.572	1.140	0.918	2.290	2.131	2.094	1.288	1.071	0.586
9	0.999	0.673	0.647	0.731	1.471	1.064	2.325	2.008	2.199	1.562	0.156	0.630
10	0.689	0.557	0.570	0.633	1.138	1.573	2.326	1.452	2.088	1.565	1.310	0.626
11	0.511	0.718	0.527	1.027	1.480	0.838	2.132	1.269	2.327	1.146	0.989	0.647
12	0.489	0.550	0.760	0.922	0.935	1.574	2.144	1.549	1.914	1.519	1.151	0.640
13	0.529	0.789	0.548	0.881	1.556	1.129	2.436	1.143	1.859	1.432	1.413	0.573
14	0.509	0.570	0.729	0.972	0.762	1.343	1.942	1.288	2.143	1.448	0.623	0.600
15	0.589	0.709	0.566	1.098	1.556	1.849	2.081	1.188	1.856	0.001	1.708	0.638
16	0.468	0.608	0.416	0.751	0.694	1.352	2.249	1.293	1.915	0.827	1.412	0.618
17	0.659	0.569	0.669	1.275	0.997	1.861	2.284	0.406	2.064	0.936	0.356	0.597
18	0.472	0.490	0.517	0.689	0.932	2.193	2.230	0.945	2.214	0.949	1.614	0.635
19	0.620	0.614	0.508	1.057	1.173	2.405	2.349	1.247	1.944	1.290	1.056	0.381
20	0.531	0.513	0.523	1.246	1.176	2.253	2.383	1.325	2.067	1.541	0.959	0.649
21	0.578	0.620	0.691	0.956	1.270	2.409	2.421	0.884	2.034	1.712	0.824	0.688
22	0.451	0.583	0.492	0.996	1.342	2.037	2.482	1.440	2.203	1.814	0.995	0.449
23	0.635	0.488	0.574	0.864	1.262	1.970	2.278	1.266	2.072	1.562	1.104	0.345
24	0.609	0.654	0.517	0.928	1.510	2.381	2.249	1.274	2.176	1.693	1.078	0.363
25	0.579	0.462	0.463	1.123	1.038	2.295	2.151	1.455	2.139	1.409	0.995	0.299
26	0.618	0.620	0.492	1.029	1.254	2.190	2.188	1.089	1.909	1.395	0.953	0.222
27	0.516	0.596	0.517	1.162	1.187	2.049	2.327	1.204	1.831	1.542	0.412	0.138
28	0.631	0.546	0.697	1.012	0.896	1.972	2.325	1.254	1.836	1.679	1.119	0.092
29	0.466		0.517	1.101	1.556	1.415	2.267	1.714	0.907	1.752	0.588	0.309
30	0.637		0.549	1.149	1.028	1.810	2.285	1.441	1.748	1.678	0.213	0.051
31	0.539		0.665		1.549		2.391	1.896		1.169		0.001
TOTAL	17.65	16.51	17.59	27.27	38.10	47.78	70.76	47.91	59.06	43.88	30.61	14.83
	1.18 Daily Average MGD											

### Deliver high quality water to customers

As noted in Appendix B, the District is meeting its goal of providing a blend of groundwater and surface water with a hardness of not more than 140 ppm.

### Increase water supply reliability

During the drought of 2009, CCWD requested that all of their raw water customers cut back on their water purchases from CCWD by 20-percent. In an effort to meet this requirement, the District increased its use of ground water to such an extent that District customers only needed to cut back on water usage by 10-percent and the District still met the CCWD 20-percent cut back. This is a demonstration that the District has been able to meet the goal of increased supply reliability through the use of groundwater.

### Increase surface water supplies for water storage or environmental enhancement

As noted in Table 3, the District was able to use an annual average groundwater quantity of 1.18 mgd which equates to 1,322 acre-feet per annum (afa). If not for the groundwater project this quantity of water would have needed to come from the Delta. The District, in 2011, freed up 1,322 afa of Delta surface water supplies for water storage and environmental enhancement, which surpassed the project goal of 840 afa the first year of phase 2 of the project going into operation.

### Protect Ground Water Supply

Contained in Appendix D is a map indicating the location of groundwater wells whose water levels are being measured by the District on a monthly basis. As can be seen from the groundwater level data from some of the wells, the District's ground water pumping has not altered the ground water levels and the District is meeting its goal of not over drafting the groundwater basin.

### **Next Steps**

The EIR for this component included a future third well in the vicinity of the future Liberty Union High School located at the southwest corner of Delta Road and Sellers Avenue. The anticipated cost of this third phase is \$6 million and is anticipated to be constructed within the next five (5) years. It is hoped that at least 75% of the cost of the project will be funded through State grants.

## **VII. APPENDICES**

The following items are attached as appendices to this report.

**APPENDIX A – Before and After Photos**

**APPENDIX B – Stonecreek Well and Blended Water Quality Data**

**APPENDIX C – Public Outreach Newsletters**

**APPENDIX D – Groundwater Levels**

**APPENDIX E - List of Grant Deliverables**

**APPENDIX A – Before and After Photos**

**Looking East at Stonecreek Well Pump Station Site**

Diablo Water District  
Stonecreek Well Pump Station Project  
Date: September 21, 2011  
Record Photos



Photo 1A:  
Pre Construction



Photo 1B:  
Post Construction

**Looking West at Stonecreek Well Pump Station Site**

Diablo Water District  
Stonecreek Well Pump Station Project  
Date: September 21, 2011  
Record Photos



Photo 2A:  
Pre Construction



Photo 2B:  
Post Construction

**Looking East at Stonecreek Well Pipeline Tie-In Point To Existing Glen Park Well Pipeline**

Diablo Water District  
Stonecreek Well Supply Pipeline Project  
Date: April 27, 2011  
Record Photos



Photo 1A:  
Post Construction



Photo 1B:  
Pre Construction



**Looking South at Stonecreek Well Pipeline Tie-In Point To Existing Glen Park Well Pipeline**

Diablo Water District  
Stonecreek Well Supply Pipeline Project  
Date: April 27, 2011  
Record Photos



Photo 2A:  
Post Construction



Photo 2B:  
Pre Construction

**Looking West at Stonecreek Well Pipeline Tie-In Point To Existing Glen Park Well Pipeline**

Diablo Water District  
Stonecreek Well Supply Pipeline Project  
Date: April 27, 2011  
Record Photos



Photo 3A:  
Post Construction



Photo 3B:  
Pre Construction

**Looking North at Stonecreek Well Pipeline Route Along East Bay Regional Park District Trail**

Diablo Water District  
Stonecreek Well Supply Pipeline Project  
Date: April 27, 2011  
Record Photos



Photo 4A:  
Post Construction



Photo 4B:  
Pre Construction

**Looking South at Stonecreek Well Pipeline Route along East Bay Park District Trail**

Diablo Water District  
Stonecreek Well Supply Pipeline Project  
Date: April 27, 2011  
Record Photos



Photo 5A:  
Post Construction



Photo 5B:  
Pre Construction

**Looking East at Location of Stonecreek Well Pipeline Connection to Stonecreek Pump Station**

Diablo Water District  
Stonecreek Well Supply Pipeline Project  
Date: April 27, 2011  
Record Photos



Photo 6A:  
Post Construction

No pre construction photo available for  
this location

## APPENDIX B – Stonecreek Well and Blended Water Quality Data

### SUMMARY OF WATER QUALITY DATA Diablo Water District Stonecreek Production Well

ANALYTE	UNITS	REPORTING LIMIT	METHOD	MCL	Stonecreek PW 5/10/10
<b>CATIONS</b>					
Calcium	mg/L	1	200.7/2340B		58
Magnesium	mg/L	1	200.7/2340B		33
Potassium	mg/L	1	200.7/2340B		2.2
Sodium	mg/L	1	200.7/2340B		110
Total Hardness	mg/L	1	200.7/2340B		280
<b>ANIONS</b>					
Bicarbonate Alkalinity	mg/L	5	SM 2310B		210
Carbonate Alkalinity	mg/L	5	SM 2310B		ND
Chloride (Cl)	mg/L	2.5	EPA 300	250/500 <sup>2</sup>	85
Cyanide (CN)	mg/L	0.0050	SM 4500-CN E	0.15	ND
Fluoride	mg/L	0.10	EPA 300	2	0.33
Hydroxide Alkalinity	mg/L	5	SM 2310B		ND
Nitrate (as NO <sub>3</sub> )	mg/L	2	EPA 300	45	3.4
Nitrate/Nitrite as N	µg/L	400	EPA 300	10,000	760
Nitrite as N	mg/L	0.10	EPA 300	1	ND
Sulfate (as SO <sub>4</sub> )	mg/L	2.5	EPA 300	250/500 <sup>2</sup>	180
Total Alkalinity	mg/L	5	SM 2310B		210
<b>PHYSICAL PARAMETERS</b>					
Color (A.P.H.A)	Color Units	1	SM 2120B	15 <sup>2</sup>	ND
Odor	T.O.N	1	EPA 140.1	3 <sup>2</sup>	ND
pH	pH units	0.01	SM 4500-H B	6.5/8.5 <sup>4</sup>	7.58
Methylene Blue Active Substance	mg/L	0.10	SM 5540C	0.5 <sup>2</sup>	ND
Specific Conductivity	µmhos/cm	1	EPA 120.1	900/1,600 <sup>2</sup>	1000
Total Dissolved Solids (TDS)	mg/L	10	SM 2540C	500/1,000 <sup>2</sup>	640
Turbidity	NTU	0.50	EPA 180.1	5 <sup>2</sup>	ND
<b>INORGANICS</b>					
Aluminum	µg/L	50	EPA 200.7	1,000 <sup>1</sup> /200 <sup>3</sup>	ND
Antimony	µg/L	6	EPA 200.8	6	ND
Arsenic	µg/L	2	EPA 200.8	10	4.8
Barium	µg/L	100	EPA 200.7	1,000	ND
Beryllium	µg/L	1	EPA 200.7	4	ND
Boron	µg/L	100	EPA 200.7	1,000 <sup>3</sup>	1300
Cadmium	µg/L	1	EPA 200.8	5	ND
Chromium (Total)	µg/L	10	EPA 200.7	50	ND
Copper	µg/L	50	EPA 200.7	1,000 <sup>2</sup>	ND
Iron	µg/L	100	EPA 200.7	300 <sup>2</sup>	ND
Lead	µg/L	5	EPA 200.8	15 <sup>3</sup>	ND
Manganese	µg/L	10	EPA 200.7	50 <sup>3</sup>	47
Mercury	µg/L	1	EPA 245.1	2	ND
Nickel	µg/L	10	EPA 200.7	100	ND
Selenium	µg/L	5	EPA 200.8	50	ND
Silver	µg/L	10	EPA 200.7	100 <sup>2</sup>	ND
Thallium	µg/L	1	EPA 200.8	2	ND
Vanadium	µg/L	3	EPA 200.8	50 <sup>4</sup>	4.1
Zinc	µg/L	50	EPA 200.7	5,000 <sup>2</sup>	ND

**SUMMARY OF WATER QUALITY DATA**  
**Diablo Water District**  
**Stonecreek Production Well**

ANALYTE	UNITS	REPORTING LIMIT	METHOD	MCL	
<b>RADIOACTIVE ANALYSES</b>					
Gross Alpha	pCi/L	1.92	EPA 900	15/5 <sup>3</sup>	3.28+-1.93
Total Alpha Radium (226)	pCi/L	0.353	EPA 903	3	0.213+-0.251
Radon	pCi/L	16.8	SM7500Rn		307+-25.9
Ra 228	pCi/L	0.290	Ra -05	2	0.849+-1.74
<b>OTHER ANALYSES</b>					
Ethylene dibromide (EDB) and 1,2-Dibromo-3-chloropropane (DBCP)	µg/L		EPA 504.1		ND
Volatile Organic Compounds (VOCs)	µg/L		EPA 524.2		ND
Glyphosphate	µg/L	6	EPA 547	700	ND
Endothall	µg/L	45	EPA 548.1	100	ND
Diquat	µg/L	0.40	EPA 549.2	20	ND
Paraquat	µg/L	2	EPA 549.2		ND
Aldicarb	µg/L	0.50	EPA 531.2	3 <sup>1</sup> /7 <sup>6</sup>	ND
2,3,7,8-TCDD	pg/L	0.212	EPA 1613	30	ND
Semivolatile Organic Compounds (SVOCs)	µg/L		EPA 525.2		ND
Asbestos	MFL	0.20	EPA 600/R-94/134	7	0
Benzo (a)pyrene	µg/L	0.10	EPA 550	0.2	ND
Chlorinated Acids	µg/L		EPA 515.1		ND
Chlorinated Pesticides and PCB's	µg/L		EPA 208		ND
Nitrogen/Phosphorous Pesticides	µg/L		EPA 507		ND

<sup>1</sup> - Primary MCL

<sup>2</sup> - Secondary MCL (recommended/upper range)

<sup>3</sup> - Action Level

<sup>4</sup> - Suggested lower/upper acceptable range

<sup>5</sup> - Notification Level

<sup>6</sup> - Archived Advisory Level

ND = Non-Detect





## Contra Costa Water District Laboratory



### DWD Blending Facility Corrosion Control Monitoring

Sample Location	Analyte	Analytical Results	Units	Collection Date
DWD Blending Facility	Alkalinity, Sum MEQ	60.6		8/9/2011
	Bicarbonate alkalinity	99	mg/L	8/9/2011
	Bromide	0.1	mg/L	8/9/2011
	Calcium (Flame)	29	mg/L	8/9/2011
	Carbonate Alkalinity	<1	mg/L	8/9/2011
	Chloride (IC)	54	mg/L	8/9/2011
	FIELD PH	8.0	pH	8/9/2011
	FIELD TEMP	25.5	°C	8/9/2011
	Fluoride	0.8	mg/L	8/9/2011
	Hardness (total)	130	mg/L	8/9/2011
	Hydroxide Alkalinity	<1	mg/L	8/9/2011
	Ion balance	-3.2	%	8/9/2011
	LAB PH	8.1	pH	8/9/2011
	Magnesium (Flame)	15	mg/L	8/9/2011
	Nitrate	2.9	mg/L	8/9/2011
	Nitrite as N	<400	µg/L	8/9/2011
	Ortho Phosphate	<0.2	mg/L	8/9/2011
	pH s	7.9		8/9/2011
	Phenolphthalein Alkalinity	0.0		8/9/2011
	Potassium	1.7	mg/L	8/9/2011
	Saturation Index	0.11		8/9/2011
	Sodium	50	mg/L	8/9/2011
	Specific conductance	520	umhos/cm	8/9/2011
	Sulfate	81	mg/L	8/9/2011
	Total Alkalinity	99	mg/L	8/9/2011
	Total anions	5.3	meq	8/9/2011
	Total cations	4.9	meq	8/9/2011
	Total Dissolved Solids (calc)	296	mg/L	8/9/2011
	Turbidity	0.10	NTU	8/9/2011




## APPENDIX C – Public Outreach Newsletters

### Spring 2011 Before Stonecreek Went Into Service



**THANK YOU FOR USING WATER WISELY**  
**TAKE ADVANTAGE OF THESE WATER CONSERVATION REBATES**  
We want to thank our customers for conserving water during last year's drought.  
To help you conserve even more and save money this spring, we encourage you to take advantage of the water conservation rebates available through the District's imported water supplier, Contra Costa Water District:



**RESIDENTIAL HIGH-EFFICIENCY CLOTHES WASHER REBATES**  
Rebates of up to \$100 to customers who purchase new qualifying high-efficiency clothes washers.

**COMMERCIAL HIGH-EFFICIENCY CLOTHES WASHER REBATES**  
Rebates of up to \$220 are offered to install high-efficiency commercial clothes washers in laundromats and apartment common laundry facilities.

**RESIDENTIAL, MULTI-FAMILY AND COMMERCIAL HIGH-EFFICIENCY TOILET REBATES**  
\$175 instant or mail-in rebate when you purchase a high efficiency toilet to replace an older high volume toilet.

**SMART SPRINKLER TIMER REBATES FOR RESIDENTIAL & COMMERCIAL CUSTOMERS**  
Rebates on select smart sprinkler timers are offered for a limited time only. Smart timers adjust the watering schedule automatically based on changes in the weather.

**COMMERCIAL IRRIGATION EQUIPMENT REBATES**  
Rebates are available for selected irrigation equipment on commercial, homeowner association and public agency sites.

**FOR INFORMATION ABOUT THE REBATES, INCLUDING HOW TO APPLY FOR THEM OR A FREE HOME WATER USE SURVEY:**  
VISIT: [www.ccwater.com/conserve](http://www.ccwater.com/conserve)  
OR CALL: 925-688-8320

**Diablo Water District**  
2107 Main Street  
P.O. Box 127  
Oakley, CA 94561-0127  
Phone: 925-925-3798

**Board of Directors:**  
Howard Hilde, President  
Enrico Gaspari, Vice President  
Kenneth L. Crockett, Director  
Edward Garcia, Director  
Richard R. Head, Director

**General Manager & Secretary:**  
Mike Yerkes

Printed on recycled paper.  
Each one of recycled paper saves 7,000 gallons of water.

**DIABLO WATER DISTRICT**

**DID YOU KNOW?**

**OUR CUSTOMERS PAY ONE OF THE LOWEST WATER RATES AROUND**  
As a result of the cost-saving successes described on the previous pages, the District is able to hold down water rates. Our water rates are among the lowest in the region as noted below:


AREA	Average Monthly Bill*
Martinez	\$86.36
Bay Point	\$93.45
Pittsburg	\$92.50
Concord (CCWD)	\$75.19
Brentwood	\$61.50
<b>Diablo Water District</b>	<b>\$59.67</b>
Antioch	\$49.88

\*The bills listed are for customers averaging 480 gallons per day.

**HOLD DOWN RATES**  
**DROUGHT PROTECTION**  
**CONSERVATION HELPS CUSTOMERS SAVE MONEY**  
**RELIABLE WATER SYSTEM**  
**CONVENIENT ONLINE SERVICES**

**ONLINE BILL PAY NOW AVAILABLE**  
Check out the District's website [www.diablowater.org](http://www.diablowater.org) and try our newest convenient, free service—online bill pay. It is secure and can help prevent delays and possible late fees from mailed checks, or bank bill pay. Later this year you will be able to log into your account and see your water use history, charges and more.

**CHECK OUT OUR WEBSITE**  
In addition to paying online, there is extensive information on water supply, water conservation, how to start or stop water service and much, much more.  
*Board Meetings typically occur on the fourth Wednesday of each month at 7:30 PM at the District's Office. Check our web site for more information on board meetings and copies of meeting agendas and minutes.*



## Spring 2011 Before Stonecreek Went Into Service

### Page 2



# WATER NEWS

## SECOND WATER WELL NEARLY COMPLETE-

THE NEW WELL WILL IMPROVE THE WATER SUPPLY AND HELP KEEP DOWN COSTS

### EXAMPLES OF WAYS WE KEEP COSTS DOWN

Diablo Water District constantly seeks new ways of improving service and lowering costs. Below are some examples:

#### Electronic Meter Reading

It used to take almost 1.5 minutes per meter to manually read 7,000 meters several years ago. By using radio-read technology, the District has cut that time to 30 seconds per meter to read 11,000 meters, saving \$93,000 in labor annually, while reducing injuries, and increasing accuracy.

#### Support for Good Local Careers

The District is utilizing interns and providing an opportunity for residents to receive valuable on the job work experience while *lowering costs* for the District. This program is backed up by the District's support for a Solano Community College program that provides training for careers in water and wastewater treatment and operations that can lead to steady jobs with great benefits. Visit [www.BACWWE.ORG](http://www.BACWWE.ORG) for more information.

#### Good Financial Management Helps Minimize Rate Increases

During the last economic boom, there were as many as

600 new homes being built annually and the District was receiving developer fees for each of them. That number plummeted to 72 last year, causing a drop in annual developer fees from \$6,000,000 to \$750,000. These fees are used to pay for capital improvement projects rather than shifting the existing rate payers. During those better economic times, the District built up reserves, which are being used now to help fund the District and keep rates low.

#### Positive Audit Report

The District's recent audit reported strong financial performance.

### HOW WE ARE HOLDING THE LINE ON WATER RATES

Between 2000 and 2011 the cost of the water we must buy from Contra Costa Water District has increased by 31%, but Diablo Water District has increased its water rates by only 4% during this same time period. The Glen Park Well, which the District built and put online in 2006, allows us to buy 15% less water from Contra Costa Water District, saving about \$450,000 per year, a total of \$2 million since 2006. A second well, named Stonecreek, is under construction and will go on line this spring, providing more drought protection as well as additional savings each year.

WE PRIDE OURSELVES ON OUR LOW RATES, BUT ARE JUST AS PROUD OF OUR PERSONALIZED, CARING SERVICE.

Customer Service Clerk, La Vonda Cantor reviews conservation information with customers Tom and Sue Lester.



### WELLS PROVIDE IMPORTANT BENEFITS

The District's groundwater wells provide a *drought supply*, part of which is pumped into the water system and blended with surface water for consistent taste and quality.

Most of the District's water supply comes from rivers of the Delta. It is stored in the Los Vaqueros Reservoir, blended with the water in the Contra Costa Canal and delivered to the Randall-Bold Water Treatment Plant in Oakley.

#### EMERGENCY BACKUP SUPPLY

In the event that surface water supplies are cut off, the District's wells can meet basic water needs.

### DROUGHT PROTECTION


Increase our water supply by 30%, providing a substantial drought buffer.

### BIG COST SAVINGS

The wells allow decreased importing of costly surface water and delay the need to spend money for new treatment plant capacity. Savings total \$2 million to-date with much more to come.

WWW.DIABLOWATER.ORG

## Winter 2011 After Stonecreek Went Into Service



**WATER NEWS**  
Winter 2011

**NEW WATER WELL – A WINNER FOR CUSTOMERS**

THE DISTRICT'S NEW LOCAL WATER WELL WINS ON ALL COUNTS: GREATER WATER SUPPLY, LOWER COSTS, AND A SECOND LOCAL GROUNDWATER SOURCE.

**NOW COMPLETE AND IN OPERATION, THE NEW WELL BRINGS AN ARRAY OF BENEFITS:**

- 1. Backup for Imported Water**  
If imported water supplies are cut off, water wells can meet our basic water needs.
- 2. Drought Protection**  
Increases our water supply by up to 30% – a substantial drought buffer.
- 3. Cost Savings: Over \$700,000 Per Year**  
Our two local wells reduce the use of costly imported river water, and reduce the need for new treatment plant capacity. The savings pay for the projects and help us keep rate increases low.
- 4. Fire and Earthquake Protection**  
Local wells with backup power can provide vital water supplies during emergencies.
- 5. Greater Water Independence**  
Local water under local control makes us less dependent on imported river water supplies.

DIABLO WATER DISTRICT: A California Special District Providing Water Service to Oakley, Bethel Island and Knightsen

**Diablo Water District**  
2107 Main Street  
P.O. Box 122  
Oakley, CA 94561-0122  
Phone: 925-625-3790  
www.diablowater.org

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Enrico Gispini, Vice President  
Kenneth L. Crockett, Director  
Edward Garcia, Director  
Richard R. Broad, Director

**General Manager & Secretary:**  
Mike Yerxa

ECRWSS  
POSTAL CUSTOMER

Printed on recycled paper.  
Each copy of recycled paper saves 7,000 gallons of water.



DIABLO WATER DISTRICT

**EASIER ONLINE BILL PAY**  
The District is improving its online bill pay system. After the first of the year you will have access to your account information anytime, day or night. It's fast and easy, and paying bills online at our website can help avoid delays and late fees from making payments through your bank's bill pay system. Go to [www.diablowater.org](http://www.diablowater.org) to pay your bill or for help and information. Visa and MasterCard are accepted.

**You Can Still Pay Your Bill Online, but After the First of the Year You Will Also Be Able To...**

- Look up your account balance
- See over 12 months of payment history
- Make automatic recurring payments
- Schedule when a payment is made
- Go green by eliminating paper bills
- Review prior 12 month water usage

**OTHER CONVENIENT BILL PAY OPTIONS:**  
Mail: Send in your check.  
Phone: Pay by credit card (delinquent accounts only).  
In Person: Pay by cash, check, credit or bank debit card at the District office.  
Visa, MasterCard and debit cards accepted.  
Auto Withdrawal: Contact Diablo Water District to sign up and allow us to withdraw your payment directly from your checking account.  
In Advance: You may pay as many months in advance as you wish, and your credit will be reflected on each monthly statement.





**THANK YOU FOR CONSERVING!**  
**WINTER CONSERVATION TIP:**  
**TURN OFF AUTOMATIC SPRINKLERS.**



## Winter 2011 After Stonecreek Went Into Service


### Page 2




**WE WORK HARD TO PROVIDE,  
CLEAN, SAFE, RELIABLE WATER SERVICE**

**OUR COMMUNITY DEPENDS  
ON WATER... ALL DAY, EVERY DAY**


High Volume, High Pressure  
Water for FIRE FIGHTING




Clean Water  
for DRINKING  
and HYGIENE




Extra Water for FUN  
and HOT SUMMER DAYS



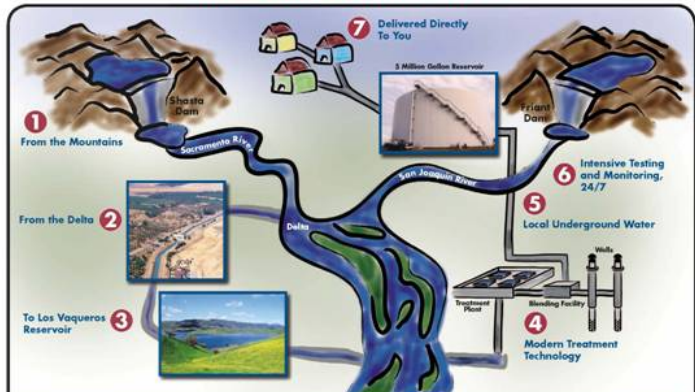
Plenty of Water for PLANTS  
and BEAUTIFUL LANDSCAPES



Our daily water production ranges from  
4 million gallons per day up to 9 million  
gallons per day, equivalent to filling as many  
as 450 household swimming pools per day.



**HOW WE DELIVER WATER TO YOU**



1 From the Mountains

2 From the Delta

3 To Los Vaqueros Reservoir

4 Modern Treatment Technology

5 Local Underground Water

6 Intensive Testing and Monitoring, 24/7

7 Delivered Directly To You

To begin with, imported water **FLOWS** hundreds of miles through **RIVERS, PIPELINES** and **CANALS** to us.

**IMPORTED WATER IS STORED** in the massive Los Vaqueros **RESERVOIR**.

**IT FLOWS** through **PIPELINES** AND **TREATED** in the modern Randall-Bold **TREATMENT PLANT**.

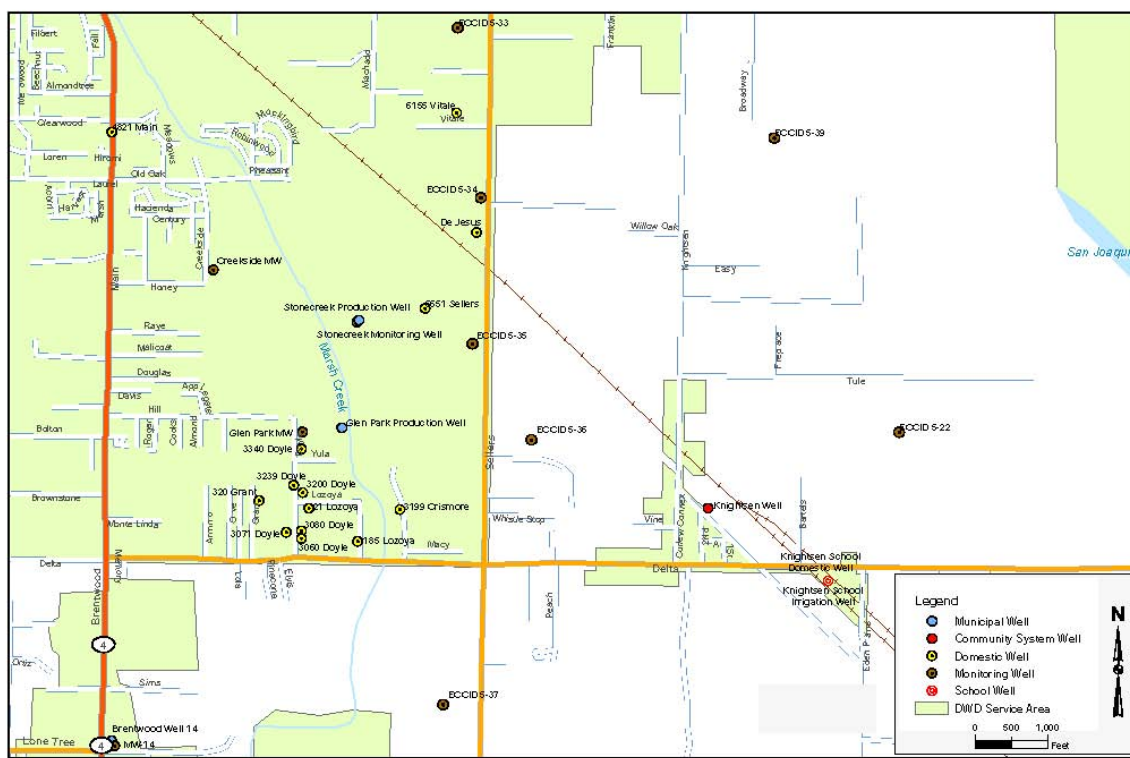
Groundwater is **PUMPED** from hundreds of feet underground through our **WELLS**.

**GROUNDWATER** and **TREATED WATER** are **BLENDED** for consistent flavor and **QUALITY**.

Your water is **MONITORED** and **TESTED** in **LABORATORIES** every day and around-the-clock; **SENT** to homes and **MEASURED** through **METERS**, **COUNTED**, **TRACKED**, and **BILLED**.

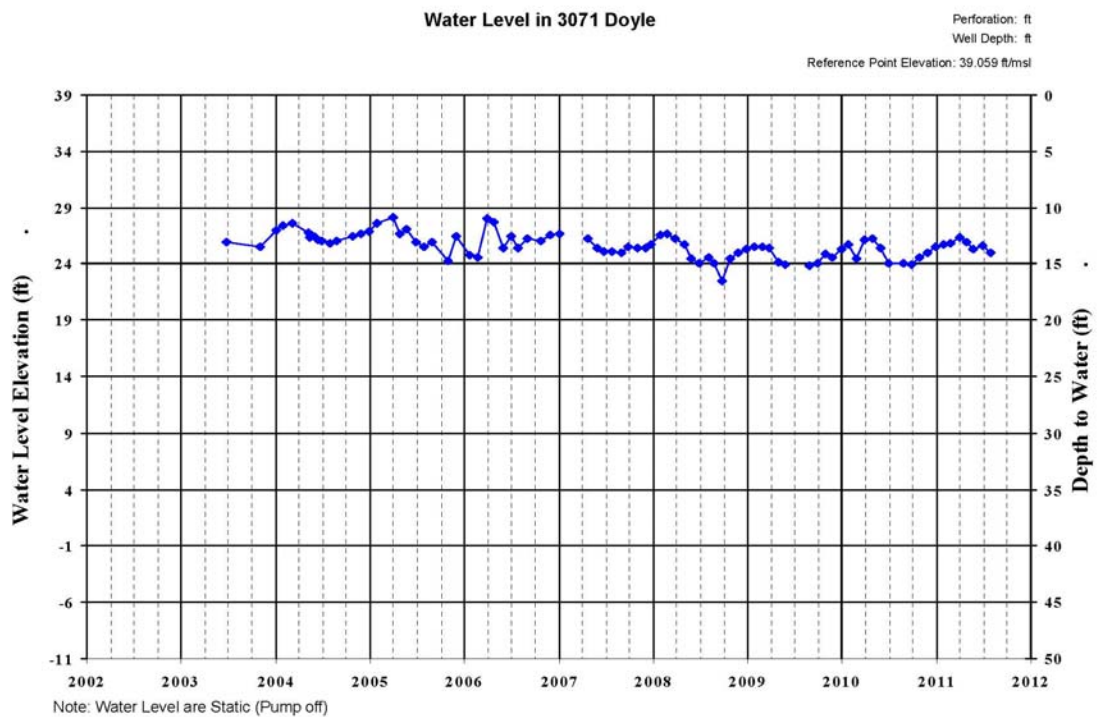
W W W . D I A B L O W A T E R . O R G

## APPENDIX D – Groundwater Levels



**LUHDORFF & SCALMANINI**  
CONSULTING ENGINEERS

Figure 6  
Groundwater Monitoring Locations in Vicinity of Glen Park Well



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**Figure 7**

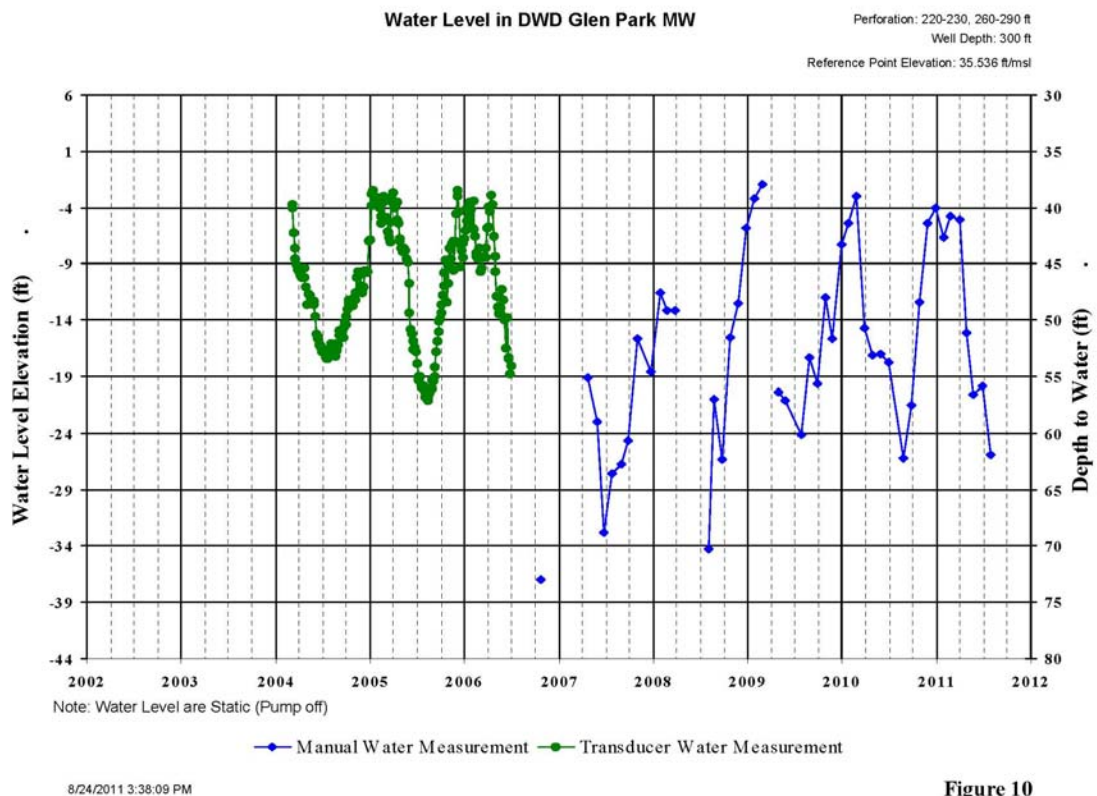
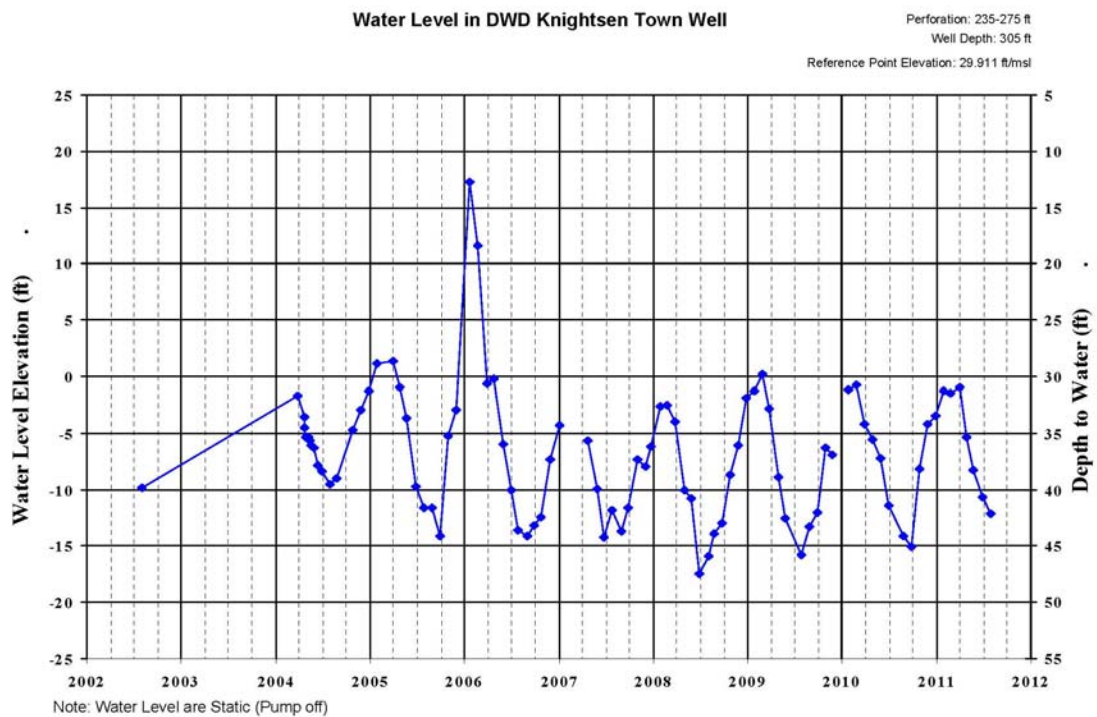


Figure 10



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Figure 12



## **APPENDIX E - List of Grant Deliverables**

GRANT PROGRESS REPORT						
Component 2: Diablo Water District Well Utilization Project						
Work Item	Item for Review #	Due Date	Revised Due Date	% Complete	Date Submitted	Notes
Exhibit A	1.1 GPS Information	Day 90 Prior to first disbursement		100	7/15/2008	Complete
	1.2 Project Assessment and Evaluation Plan (PAEP)	Day 30		100	9/3/2008	Complete
	Assessment of PAEP Status	Annually by 12/15		0		
	1.3 Monitoring Plan (MP)	N/A		0		N/A
	2.1.1 Quality Assurance Project Plan (QAPP)	N/A		0		N/A
	1.5 GAMA data	10/1/2010		100	8/18/2010	Complete
	1.6 Copy of CEQA/NEPA Documentation	Prior to first disbursement for this component.	12/10/2009	100		Complete
	1.7 Three Years of Audited Financial Statements	Prior to first disbursement for this component		100	12/28/2007	Complete
	1.8 Landowner Agreement(s)	Oct-10		100	8/28/2008	Complete
	1.9 Applicable Permits	Feb-09	2/1/2010	100	12/1/2010	Complete
	2.2.1 Feasibility Study	Jan-08		100	2/1/2008	Complete
	2.2.2 Proof of Right-of-Way Acquisition	Mar-09		100	12/1/2010	Complete
	2.2.3 Preliminary Design	May-08		100	8/28/2008	Complete
	2.2.4 Final Design	Jun-09		100	6/1/2009	Complete
	2.2.5 Pre- and Post-Construction Photos	Aug-11		100	2/29/2012	Complete
	2.2.6 Monitoring Report	Feb-11		100	8/18/2010	Complete
	2.2.8 Final Inspection with Grant Manager	Sep-11		100	11/28/2011	Complete
	2.2.10 As Built Drawings	Nov-11		100	11/28/2011	Complete
Exhibit B	6.2 Grant Summary Form	Day 30		100	7/11/2008	Complete
	6.3 NRPI	Before final component invoice		100	1/25/2012	Complete
	6.4 Draft Component Report	Dec-11		100	2/29/2012	Complete
	6.5 Final Component Report	Jan-12		0		

**APPENDIX F – List of Sub-Contractors**

<b>Activity</b>	<b>Prime Contractor</b>	<b>Sub-Contractor Under Prime</b>
Stonecreek Well Construction	Maggiora Brothers Drilling	N/A
Stonecreek Well Pipeline	Platinum Pipeline Inc.	MCK Services Viking Drillers, Inc West Coast Boring
Stonecreek Pump Station	McFadden Construction, Inc.	Pump Repair Services Co. DRW Masonry AMS Heating Hansen Painting Stan Con Roofing Richler Fencing Pacific Metro Electric

**APPENDIX G – Copies of Peer Reviewed Articles**

There are no Peer Reviewed Articles for this project.